



ARM TWP FACT SHEET

NAURU 99: An ARM Campaign in the Tropical Western Pacific

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Background

The United States Department of Energy's Atmospheric Radiation Measurement (ARM) program is installing research facilities at three locales on the planet. These facilities gather data that will help us better understand our climate and improve our ability to predict the effects of human activity on climate change. The three locales are the Southern Great Plains (SGP) of the United States in Oklahoma and Kansas, the North Slope of Alaska (NSA) around Barrow, and the Tropical Western Pacific (TWP). In the TWP we are developing three research stations. The first station began operating in October 1996 on Manus Island in Papua New Guinea. A second one started collecting data in November 1998 on Nauru Island in the central Pacific. A third station is planned for 2000 possibly on Kiritimati Island in Kiribati.

Each of the TWP island-based stations will collect a standard set of data for ten years or more. The data the island-based stations collect are supplemented by information obtained from satellites, instrumented buoys, National Weather Services in the region, and other sources. Occasional campaigns will be conducted in the TWP to answer specific scientific questions that cannot be addressed with the island-based data alone.

What are Campaigns and IOPs?

A campaign is a special effort to collect data to address specific scientific questions that cannot be answered with the standard set of island-based measurements. This can range from simply increasing the frequency of data collection at a site to supplementing the standard measurements by bringing additional instruments to the area for short periods. Because a campaign usually requires enhanced measurements at the permanent sites it is sometimes referred to as an Intensive Operational Period (IOP).

What is the purpose of the Nauru 99 Campaign?

The Nauru 99 Campaign, the first ARM campaign in the TWP, will look at the effects that the island may have on the the measurements we are making at the ARM site on Nauru and to gather data to help us better understand the interactions between the ocean and the atmosphere. When making measurements from an island we want to know how well these measurements represent conditions over the nearby ocean. For example we need to know on the average how the type and amount of clouds over the island compare to those over the nearby ocean. It is also important to understand the energy budget over the ocean compared

to that measured on the island. The Nauru 99 campaign will address these and other scientific questions necessary to understand climate and climate change in the TWP.

What activities are planned during Nauru 99?

During the Nauru 99 Campaign two research ships will collect data over the ocean near Nauru while enhanced measurements will be made at the Nauru ARM station. Additional measurements will be made with instrumented research aircraft. The campaign will also make use of data collected from instrumented buoys that already exist in the ocean around Nauru. The two research ships participating in Nauru 99 are the United States' National Oceanic and Atmospheric Administration's (NOAA) R/V¹ RON BROWN and the Japanese Marine Science and Technology Center's (JAMSTEC) R/V MIRAI. The two instrumented aircraft systems that will participate are from the Australian Bureau of Meteorology and Flinders University. The research aircraft will be based on Nauru and collect data between the island and the ships. In addition a few new instruments will be operated at the ARM station on Nauru and on topside. Weather balloons will be launched more frequently from the ARM station during the campaign.

When will Nauru 99 happen?

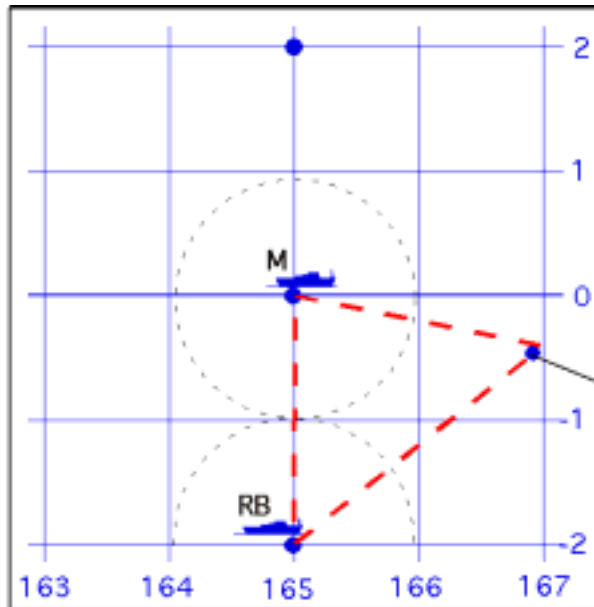
The intensive data collection period for the Nauru 99 campaign is currently scheduled for 18 June – 18 July.

What Nauru 99 activities will take place on Nauru?

As mentioned above a few additional instruments will be operated at the ARM Nauru station in the Denigomodu District and weather balloons will be launched more frequently during the campaign. A couple of small weather stations may be operated on topside to gather data to compare with that collected at the ARM site on the shore. ARM will have additional personnel at the site during the campaign to help operate the new instruments and assist with the enhanced weather balloon launching schedule.

Two research aircraft systems will operate out of the Nauru airport and make measurements over the island and between the island and the ships. One system is an instrumented Cessna aircraft operated by Flinders University in Australia. The other system is the Aerosonde system operated by the Australia Bureau of Meteorology. An Aerosonde is a miniature robotic aircraft (large model airplane) that carries meteorological instrumentation. Several Aerosondes will be used during the Nauru 99 campaign.

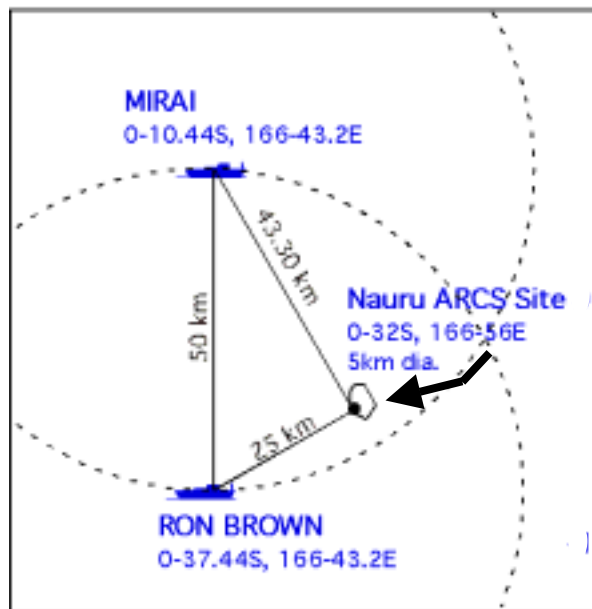
¹ Research Vessel



TRIANGLE PATTERN: This pattern supports a single-column model study and provides an intercomparison calibration of two to the TAO radiation buoys. The RON BROWN holds position at the 20S TAO buoy and the MIRAI holds position at the equator buoy. The approximate length of each leg is 200 km. Station time approximately 7 days.

Nauru
0-32S, 166-56E
5km dia.

--- Doppler intensity range, 200 km
— Research Ship
● NOAA TAO buoy with radiation



SPATIAL PATTERN: MIRAI moves to 0-10.44S and 166-43.2E, approximately 43.30 km and at an azimuth of 330 deg from the ARCS site. RON BROWN moves to 0-37.44S and 166-43.2E, 25 km and at an azimuth of 240 deg from the ARCS site. Radar ranges of 50 km are shown by the dashed lines. Station time is approximately 4 days.

Two ship configurations to be used for studies during Nauru 99



RON BROWN

ATLAS-TAO BUOY



MIRAI



AEROSONDE



CESSNA

Measurement platforms to be used during Nauru 99

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